Q.2 Find the radius of curvature at the point (r,) to the curve r^n = a^n sin n .

OR

Find the intervals for which the following curves are concave upwards or downwards:

Q.3 If u= x+y-z, v= x-y+z, then show that

$$\frac{\partial(u,v,w)}{\partial(x,y,z)}=0$$

OR

If $u = xf(x+y) + y\Phi(x+y)$, then prove that

Q.4 Evaluate $\int \frac{2x+5}{\sqrt{x^2+3x+1}}\,dx$.

OR

Prove that $\int_0^{\pi/4} \log(1+\tan\theta)\,d\theta = \frac{\pi}{8}\log 2.$

Q.5 When the region of integration R is the triangle bounded by y = 0, y = x and x =1, show that.

$$\iint_R \sqrt{4x^2-y^2}\,.\,dx\,dy = \frac{1}{3}\left(\frac{\pi}{3}+\frac{\sqrt{3}}{2}\right)$$

OR

Trace the curve ay^2 = x^2 (a-x) and show that area of its loop is $\frac{8a^2}{15}$.

---x---

Roll No......................

Total No. of Sections : 03

Total No. of Printed Pages : 04

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Annual Examination - 2018

BCA - Part II

BCA - 201

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

Paper - II

DIFFERENTIATION AND INTEGRATION

Max.Marks : 50

[illegible] $+1=0$ **Min.Marks : 20**

Note : Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

Section - 'A'

Answer the following very short-answer-type questions : **(1×10=10)**

Q.1 Write the n^{th} derivative of .

Q.2 Write the statement of Maclaurin's theorem.

Q.3 Find the asymptotes parallel to x-axis to the curve

Q.4 Show that the curve y = e^x is concave upwards everywhere.

P.T.O.

Q.5 If f (x,y) = $2x^2-xy+2y^2$, find fy (1, 2).

Q.6 Find the directional detivative of at the point (1,1,1)

in the directions : = i.

Q.7 Find the value of x dx.

Q.8 Evaluate .

Q.9 Evaluate $\int_0^{\pi/2}\int_0^{a\cos\theta} r\sin\theta\, d\theta\, dr$

Q.10 Evaluate $\int_0^1$ $(x+y)\,dxdy$.

Section - 'B'

Answer the following questions: **(3 5=15)**

Q.1 Verify Lagrange's mean value theorem for the function in the internal [2,4].

OR

If sin x, then prove that $\frac{d^4y}{dx^4}+4y=0$.

Q.2 Find all the asymptotes of the curve

OR

Prove that the radius of curvature of the point (x,y) of the catenary is

Q.3 If then prove that

OR

Find the directional derivative of in the direction of the vector $3i-4j+2k$ at the point (2,-1,3).

Q.4 Evaluate

OR

Find the value of $\int_0^{\pi/2}$ sin 2x log (tan x) d$_n$

Q.5 Evaluate .

OR

Find the area of the position of the parabola $y^2 = 4ax$ included between the x-axis, the ordinate x=2a and the latus-rectum.

Section - 'C'

Answer the following questions : **(5×5=25)**

Q.1 If y = e $\tan^{-1}x$ then prove that and

OR

If then find the value of θ when

P.T.O.